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(54) INK-JET RECORDING SHEET AND MANUFACTURE THEREOF

(57)Abstract:

PURPOSE: To obtain the high-quality image, which has the high color reproducibility and color density in water color printing and has the small difference in glossinesses at the surface of an ink receiving layer and an image recording part by specifying the glossinesses of the surface of the ink receiving layer and the mirror surface at the specified slant angle at the image recording part after the reception of the ink.

CONSTITUTION: This recording sheet comprises an ink-jet recording sheet, which contains alumina hydrate in at least an ink receiving layer in an uppermost layer and is pushed and dried on the heated mirror surface when the ink receiving layer at the uppermost surface layer is in the wet state. One or more ink receiving layers are applied on a supporting body in the ink-jet recording sheet. the glossinesses of the 60-degree mirror surfaces of the surface of the ink receiving layer and an image recording part after the reception of the ink are 25% or more and 20% or more, respectively. Here, the sufficient glossinesses can be obtained in the range of 25% or more for the 60-degree mirror-surface glossiness of the surface of the ink receiving layer obtained by a cast method and in the range of 20% or more for 60-degree mirror-surface glossiness of the image recording part after the reception of the ink. Thus sufficient glossiness cannot be obtained outside of these ranges.

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CLAIMS

[Claim(s)]

[Claim 1] In the ink jet record sheet which prepared the ink acceptance layer which has the above lamination further on the base material, while containing hydrated alumina in the ink acceptance layer of the maximum surface at least It becomes the mirror plane heated while the ink acceptance layer of this maximum surface was in the damp or wet condition from this ink jet record sheet that comes to carry out pressure-welding desiccation. And the ink jet record sheet with which 60-degree specular gloss of this ink acceptance layer front face and the image recording section after ink acceptance is characterized by being 25% or more and 20% or more, respectively.

[Claim 2] The ink jet record sheet according to claim 1 with which the ratio when using 60-degree specular gloss of a denominator and the image recording section after ink acceptance as a molecule for the 60-degree specular gloss of an ink acceptance layer front face is characterized by being 50% or more.

[Claim 3] the 1st ink acceptance layer which has the above lamination further at least on a base material, and the 2nd ink acceptance layer which is the maximum surface -- one by one -- a laminating -- carrying out -- becoming -- this -- the ink jet record sheet according to claim 1 or 2 with which the 1st ink acceptance layer component uses a pigment, aquosity adhesives, and a cationic macromolecule color fixing agent as a principal component, and the 2nd ink acceptance layer component is characterized by containing hydrated alumina.

[Claim 4] While carrying out coagulation processing of the coating liquid layer which applied the 2nd ink acceptance layer coating liquid which prepared the above ink acceptance layer [1st] upwards further on the base material or the base material, and contains hydrated alumina in the manufacture approach of an ink jet record sheet and being in a damp or wet condition Or the manufacture approach of the ink jet record sheet characterized by carrying out pressure-welding desiccation in the mirror plane heated while carrying out re-humidity and being in the damp or wet condition, after having made the mirror plane heated without carrying out coagulation processing carry out pressure-welding desiccation, or applying this coating liquid and drying.

[Claim 5] The manufacture approach of the ink jet record sheet characterized by carrying out pressure-welding desiccation in the mirror plane heated while carrying out re-humidity with the re-humid liquid containing hydrated alumina and being in the damp or wet condition, after applying the 1st [which uses a pigment, aquosity adhesives, and a cationic macromolecule color fixing agent as a principal component] ink acceptance

layer which has the above lamination further at least and drying on a base material in the manufacture approach of an ink jet record sheet.

[Claim 6] The manufacture approach of an ink jet record sheet according to claim 4 or 5 that 60-degree specular gloss of an ink acceptance layer front face and the image recording section after ink acceptance is characterized by being 25% or more and 20% or more, respectively.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the ink jet record sheet which ink absorptivity and glossiness are reconciled and can form a high definition image especially, and its manufacture approach about an ink jet record sheet and its manufacture approach.

[0002]

[Description of the Prior Art] Although an ink jet recording method makes the minute drop of ink fly by various working principles, and is made to adhere to record sheets, such as paper, and an image, an alphabetic character, etc. are recorded, development and fixation with the large versatility of ease [a high speed, the low noise, and multiple colorizing] and a record pattern have the descriptions, such as needlessness, and have spread quickly in various applications including the kanji as recording devices, such as various graphic forms and a color picture. Furthermore, the image formed by the multicolor ink jet method can acquire the record which is equal as compared with the print by process printing by the platemaking method, or the color photography method, and for the application with which there is few creation number of copies and it can be managed, since it is cheap rather than it is based on a photograph technique, it is being widely applied even to the full color image recording field.

[0003] Efforts have accomplished from equipment or the field of an ink presentation in order to use the paper of fine quality and coated paper which are used for usual printing and a usual note as a record sheet used by this ink jet recording method. However, a more advanced property came to be required also from the record sheet with improvement in engine performance of an ink jet recording device, such as improvement in the speed of equipment, highly-minute-izing, or full-color-izing, or amplification of an application. That is, as the record sheet concerned, also when a printing dot laps, the diffusion to the longitudinal direction of ink flowing out or not spreading and a printing dot is not large [the concentration of a printing dot is high, and / a color tone's being brightly skillful and absorption of ink are early, and] beyond the need, and it is required that the circumference should be smooth and should not fade etc.

[0004] Moreover, when the record image after record is damp in water, it is requested that it oozes out and it does not decolorize [the recording paper becomes dirty or], and the record form with which discoloration or fading cannot progress further easily due to exposure, such as light, and ozone gas, a oxidizing gas, is required.

[0005] In order to solve these problems, some proposals have accomplished from the former. For example, the ink jet record form with which the ink jet record form which

comes to carry out humidity of the coating for surface treatment to the stencil of low size carried out impregnation of the water soluble polymer to the sheet which carried out internal [of the urea-formalin resin powder] to JP,53-49113,A again is indicated by JP,52-53012,A. Moreover, the ink jet record form which prepared the coated layer of ink absorptivity in the support surface is indicated by JP,55-5830,A, and the example of the smear paper using the two-layer structure where ink rate of absorption differs [the example using non-colloid silica powder] in JP,55-11829,A further as a pigment in an enveloping layer is indicated by JP,55-51583,A and JP,56-157,A at it.

[0006] However, by the ink acceptance layer which generally has ink absorptivity having many openings for absorbing and holding ink therefore, in order that the ink acceptance layer with many [naturally] openings will have many interfaces with air, will have many irregularity also with a micro front face, may reflect light irregularly and may bar transparency, it is hard to come out opaquely lusterless. Furthermore, since light stops easily being able to reach the ink which permeated the opening, an image becomes whitish, and color repeatability and the depth of shade fall. Such a fault is solved, there is a feeling of gloss, and in order to obtain the high image of color repeatability or the depth of shade, some proposals have been made from the former. As an after-treatment method, for example, in JP,53-35538,A and a 53-35539 official report the approach of injecting gloss liquid after printing indicates -- having -- JP,53-50744,A -- said -- 59-196285 -- said -- 59-201891 -- said -- in a 59-222381 official report in 59-204591 and this 59-204592 list After printing to the record sheet containing thermoplastics and its particle, the method of processing using heat, a pressure, a plasticizer, or an organic solvent is indicated. In JP,57-63264,A The method of adhering the transparence toner after printing and performing pressure treatment is indicated. In JP,56-77154,A The approach of filling up the opening after printing with the matter of non-volatile colorlessness is indicated. In JP,59-190885,A The method of carrying out impregnation hardening of the printing backward photo-curing mold resin is indicated, and the method of performing the postheat treatment printed on the recording paper containing a synthetic pulp is indicated in JP,55-150370,A.

[0007] However, since the equipment for the after treatment of what can obtain a glossy record image becomes what also has complicated actuation required, the after-treatment approach mentioned above will be lacking in practicability, and equipment will become expensive further. Therefore, a feeling of gloss is in the recording surface and the image recording section which do not need the after treatment for giving such gloss, and an ink jet record sheet which moreover has high ink absorptivity is desired.

[0008] As such an ink jet record sheet, a plastics pigment is contained, for example in JP,57-82085,A and a 57-135190 official report, and what performed heating calender processing is indicated. However, in order to hold the ink absorptivity of what can satisfy the absorptivity and the gloss of ink to the ink jet record sheet using a plastics pigment simultaneously, it is necessary to have many openings between plastics pigment particles, lowering of the color repeatability and the depth of shade resulting from the high refractive index of a plastics pigment is not avoided, and a clear image is not obtained.

[0009] The proposal which used the cast method for JP,63-264391,A and JP,2-113986,A is made. However, since the former is what is stuck to the heated finish front face by pressure, and is dried after processing it in the water solution containing a cationic polyelectrolyte, when it prints, and the cationic polyelectrolyte which exists in a front

face remelts in ink, surface roughening of the shape of surface type of a printing part will be carried out, it will be lost by the feeling of gloss of a printing part, and the clear nature of an image will fall. Moreover, since the latter is using the fumed silica used for an ink acceptance layer, although a feeling of gloss is obtained, the absorptivity of ink, especially the absorptivity of the ink at the time of carrying out color overlapping printing are inferior, and drying gets worse.

[0010] Moreover, although there are the recording paper, a film, etc. which applied the resin which absorbs ink by the dissolution and swelling in order to give gloss, the thing which is going to make it absorb ink by the dissolution and swelling of such resin has absorption of ink, and slow desiccation, although gloss is acquired, and the actual condition is inferior in respect of handling for generating of the dirt by ink imprint, or a blot.

[0011]

[Problem(s) to be Solved by the Invention] This invention does not need the after treatment for giving gloss which was mentioned above, but has high ink absorptivity, and it aims to let glossiness offer the ink jet record sheet with which the difference of the glossiness of an ink acceptance layer front face and the image recording section makes small high-definition image formation possible highly, especially the ink jet record sheet for full color record with which a feeling of gloss is demanded while it has high color repeatability and the high depth of shade in printing by water color ink.

[0012]

[Means for Solving the Problem] In the ink jet record sheet which comes to paint the above ink acceptance layer further at least on a base material, while the ink jet record sheet of this invention contains hydrated alumina in the ink acceptance layer of the maximum surface at least. It becomes the mirror plane heated while the ink acceptance layer of this maximum surface was in the damp or wet condition from this ink jet record sheet that comes to carry out pressure-welding desiccation. And 60-degree specular gloss of this ink acceptance layer front face and the image recording section after ink acceptance is characterized by being 25% or more and 20% or more, respectively.

[0013] The manufacture approach of the ink jet record sheet of this invention While carrying out coagulation processing of the coating liquid layer which applied the coating liquid of the 2nd ink acceptance layer which prepared the above ink acceptance layer [1st] upwards further on the base material or the base material, and contains hydrated alumina and being in a damp or wet condition Or after making the mirror plane heated without carrying out coagulation processing carry out pressure-welding desiccation, or applying this coating liquid and drying, it is characterized by making the mirror plane heated while re-humidity was carried out and it was in the damp or wet condition carry out pressure-welding desiccation, and manufacturing an ink jet record sheet.

[0014] Moreover, after the manufacture approach of the ink jet record sheet of this invention applies the 1st [which uses a pigment, aqueous adhesives, and a cationic macromolecule color fixing agent as a principal component] ink acceptance layer which has the above lamination further at least and dries on a base material, it is characterized by making the mirror plane heated while carrying out re-humidity with the re-humid liquid containing hydrated alumina and being in the damp or wet condition carry out pressure-welding desiccation, and manufacturing an ink jet record sheet.

[0015] The cast finishing approach of carrying out a pressure welding, carrying out

pressure-welding desiccation and making the mirror plane which had the ink jet record sheet front face of this invention heated releasing from mold the spreading layer which is in a plastic damp or wet condition as an approach of carrying out desiccation shaping to a heating drum side is used. If it processes by the calender, a supercalender, etc. in order to give gloss to an ink jet record sheet, the openings of a coated layer will decrease in number with the increment in glossiness, and absorption of ink will become slow, and overflow of ink will occur from lack of absorption capacity. On the other hand, if cast finishing is performed, in order that only the front face of a coated layer may receive deformation, what has high smooth nature and high gloss and was excellent in the condition [having saved the opening of a coated layer] at the high-class feeling is obtained. However, it has the fault to which the breadth of the dot to the direction of a flat surface on the front face of a coated layer is lost since the wettability to ink gets worse under the effect of the release agent used together by that a lot of adhesives are omnipresent on a coated layer front face, and the list, the concealment nature of a pigment is discovered while the rate of absorption of ink is inferior, since priority is given to absorption into the coated layer by the pore which exists in a front face, and record concentration falls remarkably.

[0016] This invention is making the ink acceptance layer of the maximum surface contain hydrated alumina for these faults in cast finishing, and comes to solve coexistence of gloss grant, ink absorptivity, and high record concentration. The hydrated alumina used for the ink acceptance layer of the maximum surface of this invention is the amount alumina of macromolecules currently generally called alumina sol, and although it has the work which it sticks [work] to the front face of the matter which the particle of this alumina sol wears the electropositive advanced charge, and was electrified [electronegative], and makes the front face of those matter fix other electronegative matter, it is things. Moreover, it is desirable that the crystal form of the particle of alumina sol is pseudo-boehmite and boehmite, and it is still more suitable if the particle form is fibrous. Although the reason the above-mentioned effectiveness is acquired is not clear, since the particle of hydrated alumina wears the electropositive advanced charge, it is presumed to be what is depended on that a coated layer front face is fixed to the color in ink, hydrated alumina being excellent in ink permeability, etc.

[0017] However, if ink permeates into the base material which ink may permeate not only an ink acceptance layer but a base material, may produce a strike-through in a part with many amounts of ink, such as the color-overlapping section, and does not have color fixation ability further only by preparing the ink acceptance layer containing hydrated alumina on a base material, when water adheres, it has the problem that where of the color which exists in a base material will re-move, and will spoil an image.

[0018] This invention came to solve the 1st [which makes ink maintenance a key objective for the above-mentioned problem] ink acceptance layer which has the above lamination further at least by preparing on a base material. While the ink containing the color to which it was not fixed on the maximum surface permeates the 1st ink acceptance layer and is held in an ink acceptance layer by preparing the 1st ink acceptance layer which uses a pigment, aquosity adhesives, and a cationic macromolecule color fixing agent as a principal component on a base material, it is fixed to a color in an operation of the color fixing agent in an ink acceptance layer. It is thought that the water resisting property of an image improves by preventing osmosis in the base material of the ink to

which the above operation was not fixed on the maximum surface, and fixing the color in ink.

[0019] The wet cast method which carries out a direct pressure welding to the mirror plane which heated 1 humid spreading layer as the cast finishing approach, for example, and carries out desiccation shaping, 2) Although the pressure welding of the mirror plane which plasticized the spreading layer according to re-humidity, and was heated once drying a humid spreading layer is carried out, the RIWETTO cast method and 3 humid spreading layer which carry out desiccation shaping are changed into the gel state, and carry out a pressure welding to the heated mirror plane and approaches, such as the gelation cast method which carries out desiccation shaping, are learned Any of these approaches may especially be used and it is not limited. Into the re-humid liquid used by the RIWETTO cast method, the gelation cast method, etc. among these cast methods, coagulation liquid, etc., **** combination of a release agent, a penetrating agent, a coloring agent, an ultraviolet ray absorbent, an anti-oxidant, antiseptics, the ** motorcycle agent, etc. can also be carried out in addition to a gloss grant agent and a coagulant.

[0020] The 60-degree specular gloss of the ink acceptance layer front face obtained by these cast method can obtain feeling of gloss with the 60-degree specular gloss of the image recording part after ink acceptance sufficient in 20% or more of range 25% or more. Sufficient feeling of gloss cannot be obtained except this range.

[0021] Specular gloss is expressed with reflected light reinforcement, and is also called objective glossiness. On the other hand, the gloss which is expressed in language, such as a feeling of gloss and luster, and which people sense by the eye is not thoroughly in agreement with the measured value of specular gloss. As for this, it is considered to be the cause that not only reflected light reinforcement but the ratio of reflected light reinforcement and diffused-light reinforcement has influenced greatly at a feeling of gloss. The reason for having adopted specular gloss 60 degrees in this invention JIS which has adopted specular gloss 75 degrees In P-8142, application to strong glossy paper like cast paper is excepted, The comparison of the glossiness of the blank paper section and the image recording part after ink acceptance adopted specular gloss 60 degrees possible enough from reason for not being carried out with the comparison of the glossiness of the image recording part after ink acceptance sufficient in the 20-degree specular gloss currently recommended at the list to the comparison of the glossiness of strong glossy paper.

[0022] Moreover, it is considered that the image recording part after ink acceptance is because the ratio of the diffused light is small to the reflected light as compared with an ink acceptance layer front face that a feeling of gloss is obtained although the specular gloss of the image recording part after ink acceptance is smaller than the specular gloss of an ink acceptance layer front face. Furthermore, the ratio of 60-degree specular gloss of the image recording section after the ink acceptance per ink acceptance layer front face may be 50% or more. Here, at less than 50%, the balance of the contrast of a blank paper part and the record image section collapses, and a high-definition print object is no longer obtained.

[0023] As a pigment in which this hydrated alumina of this invention and concomitant use are possible, inorganic systems, such as a synthetic particle silica, a magnesium carbonate, a calcium sulfate, a barium sulfate, a zinc oxide, zinc carbonate, aluminum

silicate, an aluminum hydroxide, an aluminum oxide, a calcium silicate, a magnesium silicate, a grain amyloid particle, a modified starch particle, a plastics pigment, a crystallization cellulose particle, and an amorphous-sized cellulose particle, an organic system pigment, or a particle can be mentioned. These pigments and this hydrated alumina can be used together and used in the range which does not check the transparency of the ink acceptance layer of the maximum surface.

[0024] Although ink acceptance layers other than the maximum surface of this invention become a pigment and an aqueosity adhesives list considering a cationic macromolecule color fixing agent as a principal component, since the color nature of capacity and the printing section which absorbs and holds ink in this ink acceptance layer is required, they are the range which does not spoil these demand characteristics, and need to choose a cationic macromolecule color fixing agent as a pigment and an aqueosity adhesives list.

[0025] As a pigment contained in ink acceptance layers other than the maximum surface of this invention A synthetic particle silica, a calcium carbonate, a magnesium carbonate, a kaolin, Talc, a calcium sulfate, a barium sulfate, titanium oxide, a zinc oxide, zinc carbonate, Aluminum silicate, an aluminum hydroxide, an aluminum oxide, a calcium silicate, A magnesium silicate, the Pori aluminum-hydroxide compound, hydrated alumina, There is inorganic systems, such as a grain amyloid particle, a modified starch particle, a plastics pigment, a urea-resin pigment, a crystallization cellulose particle, and an amorphous-sized cellulose particle, an organic system pigment, or a particle, and these pigments and particles are used in the range which does not spoil the property demanded.

[0026] A synthetic particle silica, a magnesium carbonate, a barium sulfate, an aluminum hydroxide, the Pori aluminum-hydroxide compound, hydrated alumina, a grain amyloid particle, and a modified starch particle are preferably used from the point of the absorptivity of ink, and the color nature of a printing image among these pigments or a particle.

[0027] As aqueosity adhesives used for the ink acceptance layer of this invention For example, starch derivatives, such as oxidization starch, etherification starch, and phosphoric ester-sized starch; A carboxymethyl cellulose, Cellulosics, such as hydroxyethyl cellulose; Casein, gelatin, Soybean protein, polyvinyl alcohol, or its derivative; A polyvinyl pyrrolidone, Maleic-anhydride resin, a styrene-butadiene copolymer, conjugated diene system copolymer latexes [, such as a methyl methacrylate-butadiene copolymer,]; -- acrylic polymer latexes [, such as acrylic polymers, such as a polymer of acrylic ester and methacrylic ester, or a copolymer,]; -- vinyl system polymer latexes [, such as an ethylene-vinyl acetate copolymer,]; -- Or the functional-group denaturation polymer latex by functional-group content monomers, such as a carboxy group of these various polymers; Melamine resin, aqueosity adhesives [, such as heat-curing synthetic resin, such as a urea-resin,]; -- acrylic ester [, such as polymethylmethacrylate,]; -- the polymer of methacrylic ester, or copolymer-resin; -- polyurethane resin -- inorganic adhesives [, such as synthetic-resin system adhesives; colloidal silica,], such as an unsaturated polyester resin, a vinyl chloride-vinyl acetate copolymer, a polyvinyl butyral, and an alkyd resin, are independent -- or it is compounded and used.

[0028] The point of adhesive strength to polyvinyl alcohol or its derivative, and colloidal silica are desirable among these adhesives, and casein, soybean protein, and a latex are preferably used from the point of a feeling of gloss.

[0029] In the ink acceptance layer of the maximum surface of this invention, as for adhesives, the ten to 100 section is preferably used the one to 200 section to the hydrated alumina 10 section. However, in the less than 1 section, subduction of ink becomes [adhesives] large, sufficient record concentration is not obtained, but if it exceeds the 200 sections, a dot configuration will get worse.

[0030] In ink acceptance layers other than the maximum surface of this invention, especially the ratio is not limited that adhesives should just be sufficient amount for binding of a pigment although the ten to 50 section is preferably used the five to 100 section to the pigment 100 section. However, if it uses exceeding the 100 sections, opening structure will be reduced by the film formation of adhesives, or an opening will be made extremely small, and the absorptivity of ink will get worse.

[0031] Although each of well-known monomers which disaggregate and present cationicity, oligomer, or polymers can use conventionally the cationic giant-molecule color fixing agent used in the ink acceptance layer of this invention when it dissolves in water, it is the oligomer or the polymer which has the 3rd class or the 4th class ammonium preferably. Moreover, the image recorded by water color ink does not flow in water, and it is [direction] desirable and it can also add cationic resin, a cationic surface active agent, a cation denaturation inorganic particle, etc. in the ink acceptance layer of the maximum surface as a deck-watertight-luminaire-ized agent for this object. If still more nearly required, **** combination of a pigment agent, a thickener, a fluid amelioration agent, a defoaming agent, a release agent, a foaming agent, a penetrating agent, a color pigment, a coloring color, a fluorescent brightener, an ultraviolet ray absorbent, an anti-oxidant, antiseptics, the ** motorcycle agent, etc. can also be carried out.

[0032] The water color ink as used in the field of this invention is the following coloring agent and a solvent object, and a record liquid that consists of other additives. As a coloring agent, it is water soluble dye, such as direct dye, acid dye, basic dye, reactive dye, or a food dye.

[0033] For example As direct dye ** C.I.Direct Black: 2, 4, 9, 11, 14, 17, 19, 22, 27, 32, 36, 38, 41, 48, 49, 51, 56, 62, 71, 74, 75, 77, 78, 80, 105, 106, 107, 108, 112, 113, 117, 132, 146, 154, 194C.I.Direct Yellow:1, 2, 4, 8, 11, 12, 24, 26, 27, 28, 33, 34, 39, 41, 42, 44, 48, 50, 51, 58, 72, 85, 86, 87 and 88, and 98,100,110C.I.Direct Orange: 6, 8, 10, 26, 29, 39, 41, 49, 51,102C.I.Direct Red:1, 2, 4, 8, 9, 11, 13, 17, 20, 23, 24, 28, 31, 33, 37, 39, 44, 46, 47, 48, 51, 59, 62, 63, 73, 75, 77, 80, 81, 83, 84, 85, 90, 94, 99, 101, 108, 110, 145, 189, 197, 220, 224, 225,226,227,230C.I.Direct Violet:1, 7, 9, 12, 35, 48, 51, 90, 94C.I.Direct Blue: 1, 2, 6, 8, 15, 22, 25, 34, 69, 70, 71, 72, 75, 76, 78, 80, 81, 82, 83, 86, 90, 98, 106, 108, 110, 120, 123, 158, 163, 165, 192, 193, 194, 195, 196, 199, 200, 201, 202, 203, 207, 218, 236, 237,239,246,258C.I.Direct Green:1, 6, 8, 28, 33, 37 and 63, 64C.I.Direct Brown:1A, 2, 6, 25, 27, 44, 58, 95, 100, 101, 106, 112, 173, 194, 195,209,210,211 [0034] As acid dye For example, C.I.Acid Black:1, 2, 7, 16, 17, 24, 26, 28, 31, 41, 48, 52, 58, 60, 63, 94, 107, 109, 112, 118, 119 and 121, and 122,131,155,156C.I.Acid Yellow: 1, 3, 4, 7, 11, 12, 13, 14, 17, 18, 19, 23, 25, 29, 34, 36, 38, 40, 41, 42, 44, 49, 53, 55, 59, 61, 71, 72, 76, 78, 99, 111, 114, 116, 122, 135, 161, 172C.I.Acid Orange: 7, 8, 10, 33, 56, and 64C.I.Acid Red: 1, 4, 6, 8, 13, 14, 15, 18, 19, 21, 26, 27, 30, 32, 34, 35, 37, 40, 42, 51, 52, 54, 57, 80, 82, 83, 85, 87, 88, 89, 92, 94, 97, 106, 108, 110, 115, 119, 129, 131, 133, 134, 135, 154, 155, 172, 176, 180, 184, 186, 187,

249, 254, 256, 317, 318 C.I. Acid Violet: 7, 11, 15, 34, 35, 41, 43 and 49, and 75 C.I. Acid Blue: 1, 7, 9, 22, 23, 25, 27, 29, 40, 41, 43, 45, 49, 51, 53, 55, 56, 59, 62, 78, 80, 81, 83, 90, 92, 93, 102, 104, 111, 113, 117, 120, 124, 126, 145, 167, 171, 175, 183, 229, 234, 236 C.I. Acid Green: 3, 12, 19, 27, 41, 9, 16 and 20, 25 C.I. Acid Brown: 4, 14 [0035] As basic dye For example, C.I. Basic Black: 2, 8 C.I. Basic Yellow: 1, 2, 11, 12, 14, 21 and 32, 36 C.I. Basic Orange: 2, 15 and 21, 22 C.I. Basic Red: 1, 2, 9, 12 and 13, and 37 C.I. Basic As Violet: 1, 3, 7 and 10, 14 C.I. Basic Blue: 1, 3, 5, 7, 9, 24, 25, 26 and 28, 29 C.I. Basic Green: 1, 4 C.I. Basic Brown: 1, and 12 reactive dye For example, C.I. Reactive Black: 1, 3, 5, 6, 8 and 12, 14 C.I. Reactive Yellow: 1, 2, 3, 13, 14 and 15, 17 C.I. Reactive Orange: 2, 5, 7, 16 and 20, and 24 C.I. Reactive Red: 6, 7, 11, 12, 15, 17, 21, 23, 24, 35, 36, 42, 63, 66 C.I. Reactive Violet: 2, 4, 5 and 8, 9 C.I. Reactive Blue: 2, 5, 7, 12, 13, 14, 15, 17, 18, 19, 20, 21, 7 25, 27, 28, 37, 38, 40, 41 C.I. Reactive Green: 5, 7 C.I. Reactive Brown: 1, 16 [0036] furthermore -- as a food dye -- C.I. Food Black: 2 C.I. Food Yellow: -- 3, 4, 5 C.I. Food Red: 2, 3, 7, 9, 14, 52, 87 and 92, 94, 102, 104, 105, 106 C.I. Food Violet: 2 C.I. Food Blue: 1, and 2 C.I. Food Green: -- 2, 3, etc. are mentioned.

[0037] As a solvent of water color ink, moreover, water and water-soluble, various organic solvents For example, methyl alcohol, ethyl alcohol, n-propyl alcohol, Isopropyl alcohol, n-butyl alcohol, sec-butyl alcohol, Alkyl alcohols of the carbon numbers 1-4 of tert-butyl alcohol, isobutyl alcohol, etc.; Dimethylformamide, Amides, such as dimethylacetamide; Ketones, such as an acetone and diacetone alcohol, or a ketone-alcohol; tetrahydrofuran, Ether, such as dioxane; Polyalkylene glycols; ethylene glycol, such as a polyethylene glycol and a polypropylene glycol, Propylene glycol, a butylene glycol, triethylene glycol, 1, 2, 6-hexane triol, thiodiglycol, hexylene glycol, alkylene groups, such as a diethylene glycol, -- 2-6 alkylene glycol; -- a glycerol -- The low-grade alkyl ether of polyhydric alcohol, such as ethylene glycol methyl ether, the diethylene-glycol methyl (or ethyl) ether, and the triethylene glycol monomethyl ether, is mentioned. [0038] Also in the water-soluble organic solvent of these many, the low-grade alkyl ether of polyhydric alcohol, such as polyhydric alcohol, such as a diethylene glycol, the triethylene glycol monomethyl ether, and the triethylene glycol monoethyl ether, is desirable.

[0039] As other additives, PH modifier, a sequestering agent, an antifungal agent, a viscosity controlling agent, a surface tension regulator, a wetting agent, a surfactant, a rust-proofer, etc. are mentioned, for example. If it is a base material with infiltration as a base material used by this invention, any will be sufficient, for example, a general newspaper, coated paper, textile fabrics, and a nonwoven fabric will be used. This ink jet record sheet is useful also as other record sheets which need ink and toner absorptance, such as color hot printing television paper, color laser copy television paper, and a print sheet for water color ink.

[0040]

[Example] Although an example is given to below and this invention is explained to it, this invention is not limited to these examples. Moreover, especially the "section" and "%" shown in an example, unless it shows clearly, oven-dry-weight section and oven-dry-weight % is shown.

[0041] Preparation of a casein water solution: To the casein 100 section distributed in water, the calcium stearate 3 section was added as the dicyandiamide 10 section, the caustic-alkali-of-sodium 2 section, and a release agent, the heating dissolution was

carried out, and the casein water solution of 25% of solid content concentration was prepared.

[0042] To the pulp slurry which consists of the LBKP67 section of example 1 freshness 450mlCSF, and the NBKP8 section of freshness 480mlCSF The cation starch 0.6 section, the whiting 10 section, the precipitated-calcium-carbonate 15 section, and the alkyl ketene dimer 0.10 section are added. pH of a pulp slurry was adjusted to 8.2, it sank in so that it might become double-sided 5 g/m² by solid content, and the oxidized starch water solution which dissolved by size press continuously was dried [paper-milling desiccation was carried out with the Fortlinear paper machine,], machine calendering was carried out, and the coating stencil of basis weight 95 g/m² was obtained. Stockigt sizing degree was 20 seconds. On a field with much loading material distribution of this coating stencil, the amylum-oryzae (product made from micro pearl and Shimada chemistry) 90 section, The hydrated alumina (made in [industrial] formation [3 KATAROIDO A AS- a catalyst]) 10 section, Spreading desiccation of the aquosity coating liquid of 30% of solid content concentration which uses the polyvinyl alcohol (PVA117, Kuraray make) 10 section as a principal component is carried out so that it may be set to 20g of bones dry/, and m² by the air knife coating machine. Next, after carrying out humidity of the coated layer with water, while the coated layer was in the damp or wet condition, pressure-welding desiccation was carried out at the mirror plane drum heated at 120 degrees C, and the ink jet record sheet was obtained.

[0043] After applying an example 2 ink acceptance layer, while the coated layer was in the damp or wet condition, the ink jet record sheet was obtained like the example 1 to the mirror plane drum heated at 95 degrees C except having carried out pressure-welding desiccation.

[0044] In example of comparison 1 example 1, the ink jet record sheet was obtained like the example 1 to the heated mirror plane drum except having processed by the supercalender, without carrying out sticking-by-pressure desiccation.

[0045] it be aquosity coating liquid of 30% of solid content concentration which use the amylum oryzae (product made from micro pearl and Shimada chemistry) 100 section, and the polyvinyl alcohol (PVA117, Kuraray make) 10 section as a principal component in example of comparison 2 example 1 at an air knife coating machine 20g of bones dry/, and m² spreading desiccation be carried out so that it might become, and while the coated layer be in the damp or wet condition, the ink jet record sheet be obtained like the example 1 to the mirror plane drum heated at 95 degrees C except having carry out pressure welding desiccation.

[0046] On the coating stencil used in the example 3 example 1, the hydrated alumina (made in [industrial] formation [3 KATAROIDO A AS- a catalyst]) 10 section, Aquosity coating liquid of 20% of solid content concentration which uses the barium-sulfate 10 section and the casein water-solution (25% of solid content) 100 section as a principal component is applied so that it may become bone-dry 15 g/m² by the air knife coating machine. While the sulfuric-acid band water solution next performed coagulation processing 3% and the coated layer was in the damp or wet condition, pressure-welding desiccation was carried out at the mirror plane drum heated at 95 degrees C, and the ink jet record sheet was obtained.

[0047] The cation starch 0.6 section, the whiting 5 section, the precipitated-calcium-carbonate 5 section, and the alkyl ketene dimer 0.05 section were added, pH of a pulp

slurry was adjusted to 8.2, with the Fortlinear paper machine, paper-milling desiccation was carried out, machine calendering was carried out to the pulp slurry which consists of the LBKP81 section of example 4 freshness 450mlCSF, and the NBKP9 section of freshness 480mlCSF, and the coating stencil of basis weight 90 g/m² was obtained. Stockigt sizing degree was 10 seconds. On a field with much loading material distribution of this coating stencil, as 1st ink acceptance layer, the synthetic amorphous silica (Syloid 620, product made from Fuji DEVISON) 100 section, As adhesives, the polyvinyl alcohol (PVA117, Kuraray Co., Ltd. make) 50 section, as a color fixing agent -- cationic resin (SUMIRE gap gin 1001 and cation loading dose 3.5meq./g --) Spreading desiccation of the aquosity coating liquid of 16% of solid content concentration which uses the 30 by Sumitomo Chemical Co., Ltd. section as a principal component is carried out so that it may become bone-dry 10 g/m² by the air knife coating machine. On the 1st ink acceptance layer further as 2nd ink acceptance layer The hydrated alumina (made in [industrial] formation [3 KATAROIDO A AS- a catalyst]) 10 section, Spreading desiccation of the aquosity coating liquid of 18% of solid content concentration which uses the casein water-solution (25% of solid content) 220 section as a principal component is carried out so that it may become bone-dry 8 g/m² by the air knife coating machine. Next, after carrying out humidity of the coated layer with water, while the coated layer was in the damp or wet condition, sticking-by-pressure desiccation was carried out at the mirror plane drum heated at 120 degrees C, and the ink jet record sheet was obtained.

[0048] In example of comparison 3 example 4, the ink jet record sheet was obtained like the example 4 except having applied the aquosity coating liquid which diluted the casein water solution (25% of solid content) to 13% as a 2nd ink acceptance layer.

[0049] In example of comparison 4 example 4, the ink jet record sheet be obtained like the example 4 except having carry out spreading desiccation of the aquosity coating liquid of 25% of solid content concentration which use the kaolin clay (UW-90 and Engelhard M&C shrine make) 100 section, the casein water solution 80 section, and the SBR latex 20 section as a principal component as 2nd ink acceptance layer, so that it might become bone dry 18 g/m² by the air knife coating machine.

[0050] In example 5 example 4 as 2nd ink acceptance layer The hydrated alumina (made in [industrial] formation [3 KATAROIDO AAS- a catalyst]) 10 section, Aquosity coating liquid of 19% of solid content concentration which uses the casein water-solution (25% of solid content) 290 section as a principal component is applied so that it may become bone-dry 8 g/m² by the air knife coating machine. While the coated layer was in the damp or wet condition, the ink jet record sheet was obtained like the example 4 to the mirror plane drum heated at 95 degrees C except having carried out pressure-welding desiccation.

[0051] In example of comparison 5 example 4 as 2nd ink acceptance layer The hydrated alumina (made in [industrial] formation [3 KATAROIDO AAS- a catalyst]) 10 section, Aquosity coating liquid of 10% of solid content concentration which uses the casein water-solution (25% of solid content) 18 section as a principal component is applied so that it may become bone-dry 8 g/m² by the air knife coating machine. While the coated layer was in the damp or wet condition, the ink jet record sheet was obtained like the example 4 to the mirror plane drum heated at 95 degrees C except having carried out pressure-welding desiccation.

[0052] It sets in the example 6 example 4, and is hydrated alumina (CATA LOID AP) as 2nd ink acceptance layer. a catalyst -- formation -- the 10 made from industry section, and a casein water solution (25% of solid content) -- the 60 sections Aquosity coating liquid of 16% of solid content concentration which uses the SBR latex 10 section as a principal component is applied so that it may be set to 9g of bones dry/, and m2 by the air knife coating machine. Next, the sulfuric-acid band water solution performed coagulation processing 3%, and while the coated layer was in the damp or wet condition, the ink jet record sheet was obtained like the example 4 to the mirror plane drum heated at 95 degrees C except having carried out pressure-welding desiccation.

[0053] The cation starch 0.6 section, the whiting 5 section, the talc 5 section, and the alkyl ketene dimer 0.15 section were added, pH of a pulp slurry was adjusted to 8.0, with the Fortlinear paper machine, paper-milling desiccation was carried out, machine calendering was carried out to the pulp slurry which consists of the LBKP80 section of example 7 freshness 350mlCSF, and the NBKP10 section of freshness 380mlCSF, and the coating stencil of basis weight 70 g/m2 was obtained. Stockigt sizing degree was 25 seconds. a field top with much loading material distribution of this coating stencil -- as an ink acceptance layer -- synthetic amorphous silica (Ms. KASHIRU P-78A --) As the 70 by the Mizusawa chemistry company section, the amylum-oryzae (mean particle diameter of 4.9 micrometers) 30 section, and adhesives, the polyvinyl alcohol (NM-11, Japanese composition company make) 20 section, as a color fixing agent -- cationic resin (poly fix 601 and cation loading dose 6.9meq./g --) It is aquosity coating liquid of 16% of solid content concentration which uses the 20 by Showa High Polymer Co., Ltd. section as a principal component at an air knife coating machine Bone-dry 15 g/m2 Spreading desiccation is carried out so that it may become. The hydrated alumina (made in [industrial] formation [2 KATAROIDO A AS- a catalyst]) 10 section, While humid processing was carried out with re-humid liquid of 5% of solid content concentration which uses the casein water-solution (25% of solid content) 600 section as a principal component and the coated layer was in the damp or wet condition, sticking-by-pressure desiccation was carried out at the mirror plane drum heated at 95 degrees C, and the ink jet record sheet was obtained.

[0054] In example of comparison 6 example 7, the ink jet record sheet was obtained like the example 7 except having used water for re-humid liquid.

[0055] The cation starch 0.6 section, the whiting 5 section, the talc 5 section, and the alkyl ketene dimer 0.20 section were added, pH of a pulp slurry was adjusted to 8.0, with the Fortlinear paper machine, paper-milling desiccation was carried out, machine calendering was carried out to the pulp slurry which consists of the LBKP80 section of example 8 freshness 350mlCSF, and the NBKP10 section of freshness 380mlCSF, and the coating stencil of basis weight 110 g/m2 was obtained. Stockigt sizing degree was 35 seconds. On a field with much loading material distribution of this coating stencil, as 1st ink acceptance layer The synthetic amorphous silica (fine seal X-37B, Tokuyama Soda Co., Ltd. make) 50 section, As the amylum-oryzae (mean particle diameter of 4.9 micrometers) 50 section, and adhesives, the polyvinyl alcohol (PVA117, Kuraray Co., Ltd. make) 10 section, as a color fixing agent -- cationic resin (a violet -- gap gin 1001 and cation loading dose 3.5meq./g --) It is aquosity coating liquid of 16% of solid content concentration which uses the 30 by Sumitomo Chemical Co., Ltd. section as a principal component at an air knife coating machine Bone-dry 8 g/m2 Spreading desiccation is

carried out so that it may become. On the 1st ink acceptance layer further as 2nd ink acceptance layer The hydrated alumina (made in [industrial] formation [3 CATA LOID AS- a catalyst]) 10 section, The aquosity acrylic copolymer-resin (JURIMA FC-60, Nippon Junyaku make) 2 section, cationic resin (a violet -- gap gin 1001 and cation loading dose 3.5meq./g --) It is aquosity coating liquid of 12% of solid content concentration which uses the 3 by Sumitomo Chemical Co., Ltd. section as a principal component at an air knife coating machine Bone-dry 3 g/m² Spreading desiccation is carried out so that it may become. Next, after carrying out humidity of the coated layer with water, while the coated layer was in the damp or wet condition, sticking-by-pressure desiccation was carried out at the mirror plane drum heated at 120 degrees C, and the ink jet record sheet was obtained.

[0056] In example 9 example 8 as 2nd ink acceptance layer The hydrated alumina (made in [industrial] formation [3 KATAROIDO AAS- a catalyst]) 10 section, The aquosity acrylic copolymer-resin (JURIMA FC-65, Nippon Junyaku make) 5 section, cationic resin (a violet -- gap gin 1001 and cation loading dose 3.5meq./g --) It is aquosity coating liquid of 12% of solid content concentration which uses the 5 by Sumitomo Chemical Co., Ltd. section as a principal component at an air knife coating machine Bone-dry 4 g/m² The ink jet record sheet was obtained like the example 8 except having carried out spreading desiccation so that it might become.

[0057] Assessment of an ink jet record sheet was based on the following approach. The ink jet printer made from canon (BJC-820J) was used for ink absorptivity, it pressed paper of fine quality against the printing section immediately after solid printing of the red printing section (Magenta + yellow) (after about 1 second), and judged it by whether dirt comes out or it does not come out. O What dirt has not generated, and ** show what dirt is slightly regarded as, and the thing which dirt generated [x].

[0058] The ink jet printer made from canon (BJC-820J) was used for record concentration, and it measured the black printing section using Macbeth RD-918 mold.

[0059] 60 degrees, specular gloss was measured using Nippon Denshoku Industries deflection glossmeter VGS-1001DP according to JIS-Z 8741-1983. The 60-degree specular gloss of the image recording section was measured about the black printing section.

[0060] About the record sheet after ink jet printer (BJC-820J) printing made from canon, the clear nature of a print object synthesized the color nature of the whole feeling of gloss, and the image recording section, and evaluated by viewing. a judgment result -- O fitness and ** -- a little -- a defect and x -- it was poor and was shown. The assessment result of these record sheets is shown in a table 1.

[0061]

[A table 1]

実施例 又は 比較例	インク 吸収性	60度鏡面光沢度 Gs (60°)		光沢度の 比率 (%)	黒印字 部光学 濃度	印画物 の 鮮明性
		インク受理 層表面	画像 記録部			
実施例1	○	33.0	20.2	61.2	1.35	○
実施例2	○	40.3	21.7	53.8	1.38	○
比較例1	○	9.6	2.1	21.9	1.30	△
比較例2	×	45.0	19.2	42.7	1.39	×
実施例3	○	32.2	23.7	73.6	1.28	○
実施例4	○	51.0	32.8	64.3	1.33	○
比較例3	○	8.8	1.1	12.5	1.20	○
比較例4	△	58.2	50.3	86.4	0.65	×
実施例5	○	51.1	42.3	82.8	1.36	○
比較例5	○	32.0	23.2	72.5	0.94	△
実施例6	○	56.0	34.5	61.6	1.24	○
実施例7	○	30.5	21.7	71.1	1.26	○
比較例6	○	4.7	1.3	27.6	1.31	△
実施例8	○	27.3	22.1	81.0	1.36	○
実施例9	○	35.4	30.5	86.2	1.34	○

[0062]

[Effect of the Invention] While the ink jet record sheet of this invention does not need the after treatment for giving gloss, but having high ink absorptivity and having high color repeatability and the high depth of shade in printing by water color ink, the difference of the glossiness of an ink acceptance layer front face and the image recording section makes [glossiness] small high-definition image formation high possible.